

WITHDRAWN

COMMERCIAL STANDARD CS113-63

OIL-BURNING FLOOR FURNACES EQUIPPED WITH VAPORIZING POT-TYPE BURNERS

as of 10/72

(Effective August 1, 1963)

1. PURPOSE

1.1 This standard provides requirements for the quality and performance of oil-fired floor furnaces for the guidance of manufacturers, distributors, installers, contractors and purchasers.

2. SCOPE

2.1 This standard applies to oil-fired, flue-connected floor furnaces equipped with vaporizing pot-type burners with or without mechanical draft or forced circulation, either manually or automatically controlled and includes the following sections:

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3. DEFINITIONS

3.1 Floor furnace. - An oil-burning floor furnace is defined as a completely self-contained oil-burning furnace-burner unit, flue-connected, and arranged to be inserted into and suspended from the floor, having integral warm-air discharge and cold-air return, with provisions for control and operation from floor level.

3.2 Vaporizing pot-type oil burner. - This is a device for the combustion of fuel oil, consisting of an oil-vaporizing bowl or other receptacle to which the liquid fuel may be fed in controllable quantities, the heat of combustion being used to vaporize the fuel, with provisions for admitting air and mixing it with the oil vapor in combustible proportions.

3.3 Manufacturer. - For the purpose of this standard, the manufacturer shall be the company or organization that evidences its responsibility to the purchaser by (1) permanently affixing its name, address, and nationally registered trade-mark or trade name to the furnace; (2) printing its name, address, and nationally registered trade-mark or trade name on the instructions; and (3) by having its name and address listed in the Underwriters' Laboratories, Inc., List of Inspected Appliances.

4. GENERAL REQUIREMENTS

4.1 Safety. - The furnace shall meet the safety requirements of Underwriters' Laboratories, Inc. Presence of the label of Underwriters' Laboratories, Inc., on the furnace shall be accepted as evidence of compliance with these requirements.

4.2 Durability. - The design and construction of the furnace shall be such as to insure

its durability in service, as outlined in Section 5 of this standard.

4.3 Dependability. - The furnace shall be capable of functioning uniformly and reliably when installed and adjusted in accordance with the manufacturer's instructions.

4.4 Testing and rating. - Each model of furnace shall be tested and rated as outlined in this standard. Ratings shall be clearly set forth in the manufacturer's catalog or literature and on the nameplate, as outlined in Sections 8 and 9 of this standard.

4.5 Over-all-efficiency. - The furnace shall be capable of meeting the minimum efficiency requirements outlined in Section 6 of this standard.

4.6 Operating instructions. - Each furnace shall be accompanied by a complete set of operating instructions covering essential points with respect to selection of fuel, operation, and upkeep. There also shall be included, either in these instructions or separately, installation instructions outlining the conditions of installation that must be fulfilled in order that successful operation of the unit may be obtained. These installation instructions may, at the option of the manufacturer, be in sufficient detail so that installation may be made from the instructions.

5. DESIGN AND CONSTRUCTION

5.1 The outer casing, or jacket, shall be constructed of material of such strength that it is not readily damaged or dented in shipment or use.

5.2 Oil burners shall be of the vaporizing pot-type constructed of steel of not less than No. 20 gage (See par. 5.5), or of other suitable material of equal resistance to heat, corrosion, and fuel leakage.

5.3 Combustion chambers. - Radiating drums, and/or other surfaces exposed to the direct heat of the burner flame and/or to the products of combustion shall be constructed of sheet steel of not less than No. 20 gage or of other suitable materials of equal resistance to heat and corrosion. The temperature of the metal shall not exceed 1,000° F. under conditions of the rating test as specified in paragraphs 7.1 to 7.7 inclusive, unless constructed of heat-resisting material suitable for the temperature encountered. Combustion chambers shall be fitted with doors or equivalent means for permitting access to interior surfaces as required for cleaning and servicing.

5.4 Flue collar shall be constructed of a material conforming to that specified in paragraph 5.3 for the combustion chamber, and shall be rigidly attached at the flue outlet of the furnace. It shall afford convenient suitable means for attaching the smoke pipe securely to the furnace.

5.5 Sheet-steel gages. - All sheet-steel gages specified in this standard shall be interpreted as indicated below:

Sheet steel gage number	Gage thickness	Minimum metal thickness
	inch	inch
20	0.0359	0.0319
22	.0299	.0269
24	.0239	.0209
26	.0179	.0159
28	.0149	.0129

5.6 Oil control and lighting. - Excepting equipment designed for self-lighting and

automatic control of oil flow, each furnace shall be so designed that the burner can be lighted and the oil flow regulated from the floor level.

5.7 Finish. - Metal surfaces of furnace casings, grilles, and accessories shall be adequately protected against rust or corrosion and against damage during manufacture, test, shipment, and reasonable conditions of storage.

5.8 Furnace accessories and fittings. -

5.8.1 The control valve or other means for oil control shall be accessible for operation and servicing and shall have means for (a) controlling the desired oil flow, (b) indicating the approximate high-and low-fire settings, and (c) restricting the maximum fuel feed rate, which shall not exceed by more than 5 percent the rate used in establishing the maximum published rating.

5.8.2 Constant-level valve, if used, shall be of the manual reset, float and trip type permitting air escapement, or otherwise be so constructed as to prevent excessive accumulations of oil in the valve. It shall be rigidly mounted on the furnace and supported independently of the piping. All parts shall be made of corrosion-resistant material.

5.8.2.1 Nameplate rating of the constant-level valve shall not exceed the average fuel rate observed during the Underwriters' Safety Test.

5.8.2.2 A strainer shall be placed in the fuel supply line to the constant-level valve. It shall be readily removable for cleaning.

5.8.3 An automatic draft regulator that meets the approval requirements of Underwriters' Laboratories, Inc., shall be furnished with each floor furnace, with adequate instructions for its use.

5.8.4 Gaskets, where required for fuel-handling parts, shall be of soft copper, copper asbestos, hard lead, or approved equivalent for screwed joints, and of Underwriters' listed sheet packing or its equivalent for bolted joints.

6. PERFORMANCE

6.1 The furnace shall be capable of meeting the following minimum performance requirements when tested as outlined in accordance with Section 7 of this standard.

6.2 Lighting and warming up burner. - Adequate provision shall be made to insure ease of lighting and to insure against the burner flame being extinguished after lighting and before the burner has become thoroughly heated.

6.3 Operation of burner and controls. -

6.3.1 Controls for fuel and draft shall function easily and reliably.

6.3.2 The burner shall be capable of functioning uniformly and reliably without excessive carbonization or other phenomena that would impair its safe and proper operation on the grades of fuel recommended by the manufacturer for use therein.

6.3.3 The furnace shall operate dependably and smoke shall not exceed #6 spot on the Shell-Bacharach Smoke Meter at high fire, and also at low fire setting if the furnace has a low fire phase of operation.

6.3.4 Thermostatically controlled burners shall be provided with dependable ignition systems. Oil pilots, if used, shall operate without excessive smoke.

6.4 Heating capacity. - The furnace shall be capable of delivering the test heat output or maximum output rating (item 18) on data and report sheet, page 12 when tested as outlined in Section 7 of this standard.

6.5 Operating efficiency. - The furnace shall be capable of operating with an over-all efficiency of not less than 70 percent when tested at high-fire operation under the draft recommended by the manufacturer, but in no case shall the draft be less than 0.02 in., nor more than 0.06 in., as outlined in paragraph 7.7.

7. LABORATORY TEST CODE

7.1 The purpose of this code is to provide a uniform standard method for ascertaining the test heat output (maximum output rating), in Btu per hour, of flue-connected oil-burning floor furnaces of the type covered by this standard when operating under normal service conditions.

7.2 Principle. -

7.2.1 Since no simple and accurate method is known for measuring the heat output of an oil furnace directly, a heat-loss calculation is to be relied upon.

7.2.2 This method is based on the principle that A, the total heat of the fuel used, minus the heat lost in the flue gases equals C, the net heat delivered to the room, then

$$C/A = E,$$

in which E is the efficiency.

7.2.3 Care must be used in setting up and adjusting the furnace, as well as in selecting, calibrating, and accurately reading the instruments used for rating tests.

7.3 Furnace test set-up. -

7.3.1 The furnace shall be installed, in accordance with the instructions of the manufacturer, in a standard test platform (See fig. 1, A and B) in a room free from drafts, with flue connections, accessories, and draft regulator, as shown in figure 1 and 2 of this standard. If the furnace is equipped with integral draft regulator, it shall be sealed for the tests.

7.3.2 Provision shall be made for the draft recommended by the manufacturer for high-fire operation of the furnace, also for maintaining at least 70° F. observed room temperature.

7.4 Instruments and their location. -

7.4.1 A calibrated laboratory-type thermometer for taking air temperature shall be located as shown in figure 1, A and B.

7.4.2 A draft gage with an accuracy of ± 0.0025 in. of water column shall be connected as shown in figure 3.

7.4.3 A potentiometer (suggested range 0° to 1,200° F. or equal).

7.4.4 A No. 20 gage iron-constantan thermocouple or equivalent thermocouple with holder, as shown in figures 3 and 4.

7.4.5 Gas analysis apparatus, preferably of the Orsat type, capable of determining CO₂ with an accuracy of plus or minus one-fourth of one percent or better, and a suitable method of measuring CO, such as that based on the dry-chemical colorimetric type of reaction.¹

¹ Instruments employing this principle are commercially available and inquiry regarding current sources of supply should be directed to Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois.

7.4.6 Suitable means for measuring the flow of oil to the furnace (measurement by weight preferred).

7.4.7 A Shell-Bacharach Smoke Meter (See figs. 5, 6, and 7.)

7.4.8 A stop watch.

7.5 Smoke determination - Shell Bacharach filter paper test method for determining smoke density in flue gases. -

7.5.1 Outline of method. - The filter paper method for determining smoke density in flue gases involves passing through filter paper, as specified below, a test flue-gas volume of 2,250 (± 100) cubic inches (standard conditions) for each square inch effective surface area of filter paper used. Sampling device shall be of such construction that total travel of flue-gas sample from flue to filter paper shall not exceed 16 inches. Suitable laboratory and portable field service equipment is illustrated in figures 5 and 6.

The resultant test smoke spot on the test filter paper is measured to establish its color density by visual matching with a smoke scale, as specified below, consisting of 10 graded numbered spots ranging from white to black. The closest match determines the gross smoke spot number of the test spot. When making this comparison, test filter paper must be backed by a white surface having absolute surface reflectance of not less than 75 percent.

Net smoke spot number shall be determined by deducting from the gross smoke spot number, the smoke spot number obtained by matching the spot obtained on filter paper through which has been drawn a sample of air from the space from which the combustion air is being supplied, using the same equipment, filter paper, test volume, and evaluation as were used in measuring gross smoke spot number. In case of disagreement on the visual net or gross test spot number evaluation, the photometric smoke spot number evaluation described below shall be employed.

7.5.2 Specification of filter paper. - Test filter paper is required, made from white filter paper stock having absolute surface reflectance of between 82.5 percent and 87.5 percent determined by photometric measurement. When making this reflectance measurement, filter paper must be backed by a white surface having absolute surface reflectance of not less than 75 percent. When clean air is drawn through clean filter paper at a rate of 1,125 cubic inches (60° F., 1 atmosphere pressure) per square inch effective surface area of filter paper per minute, the pressure drop across the filter paper should fall between limits of 0.5 inch and 2.5 inches of mercury.

7.5.3 Specification of smoke scale. - The smoke scale (figure 7) required for use with the filter paper method consists of 11 spots consecutively numbered from 0 to 10² ranging in equal photometric steps from white through neutral shades of gray to black, imprinted or otherwise processed on white paper or plastic stock having an absolute surface reflectance of between 82.5 and 87.5 percent, determined photometrically. The smoke scale spot number is defined as the reduction in reflected incident light (due to existence of soot) divided by 10. Thus, the first (perfectly white) spot, which is the color of the unimprinted scale, will be number 0, since there will be in the case of this spot no reduction in reflected incident light directed thereon. The last spot, however, is very dark, reflecting none of the incident light directed thereon; thus in this case the reduction in reflected incident light is 100 percent, which, divided by 10, gives to this darkest spot the number 10.² Intermediate spot numbers are similarly established. Limit of permissible reflectance variation of any smoke scale spot is not to exceed ± 3 percent relative reflectance. Such smoke scales are sufficiently accurate for field use and for many laboratory smoke testing applications. However, specially calibrated scales, known as certified smoke scales, sometimes will be required (as in the case of Underwriters' Laboratories, Inc., burner

² It is permissible to omit the number 10 spot from the smoke meter scale, since the number 9 spot is sufficiently dark for fuel oil combustion applications.

performance rating tests) for which the specifications are given in the following paragraph.

A certified smoke scale is obtained by individually calibrating each smoke spot of a normal smoke scale. The normal smoke scale is first mounted in the light beam of a suitable type of reflectance photometer, and the photometer is adjusted to read 100 percent when the light beam is directed at spot number 0. Each imprinted smoke scale spot is then in turn exposed to the photometer light beam and the percentage reduction in reflected light due to the imprinting measured. Each smoke scale spot number is then established by the percentage reduction in incident light divided by 10. These precise smoke spot numbers expressed in decimal values to the nearest tenth shall then be furnished with the suitably identified scale.

Where the smoke scale is protected with a plastic or transparent cover, the construction employed shall be such that when the smoke spot on the filter paper is viewed for matching with the numbered spots on the smoke scale, both shall be visible through the same thickness and number of sheets of transparent protective cover.

7.5.4 Photometric test spot number evaluation. - The human factor involved in visually comparing filter paper test spots with smoke scale spots can be eliminated by resort to direct use of a suitable photometer for evaluating test spots. To make this direct photometric test spot evaluation, the following procedure shall be employed: Filter paper backed by material having absolute surface reflectance of not less than 75 percent shall be mounted in the light beam of a suitable type of reflectance photometer with beam focused on a clean, unused surface of the filter paper adjacent to the smoke spot, and the photometer adjusted to read 100 percent reflectance in terms of the light reflected from this clean surface. Test smoke spot on filter paper shall then be exposed to the photometer light beam and the percentage reduction in reflected light due to the presence of smoke particles on and in the filter paper shall be measured. Gross smoke spot number shall be defined as equal to this percentage reduction in reflected light divided by 10. Net smoke spot number shall be determined by deducting from the gross smoke spot number the smoke spot number determined by measurement of a filter paper through which has been drawn a duplicate sample of air from the space from which combustion air is being supplied, using the same equipment, filter paper, test volume, and calculation as were used in measuring gross smoke spot number.

7.5.5 Specification of photometer. - The photometer to be employed for direct test spot number evaluation shall be of the electrically operated reflectance type employing a barrier layer cell, fitted with special means to accommodate filter paper test disks. It is to be furnished complete with green tristimulus filter and with reflectance standards of approximately 20, 40, 60, and 80 percent absolute reflectance, to permit photometer readings between 10 and 90 percent relative reflectance (relative to clean filter paper) to be made within ± 2 percent.

7.5.6 Availability of smoke meters, filter paper, scales, and photometers. - Suitable instruments and accessories for both field and laboratory testing are commercially available. Inquiry regarding current sources of supply should be directed to Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois.

7.6 Fuel oil. -

7.6.1 Selection and heating value of fuel oil. - The fuel used for furnace rating tests shall be not heavier than "Commercial Standard grade No. 1" (CS12-48 or latest revision thereof), and shall be assumed to have a gross heating value of 19,750 Btu/lb., except in the case of additional rating tests as provided for in paragraph 7.6.2.

7.6.2 When grades of oil heavier than No. 1 are recommended by the manufacturer, additional rating tests shall be conducted using these heavier fuels. The gross heating value of such fuel shall be assumed to be as given in the following table.

Gravity	Density	Calorific values ¹	
Degrees API at 60° F	lb/gal	Btu/lb	Btu/gal
30	7.305	19,420	141,800
31	7.260	19,450	141,200
32	7.215	19,490	140,600
33	7.171	19,520	140,000
34	7.128	19,560	139,400
35	7.085	19,590	138,800
36	7.043	19,620	138,200
37	7.001	19,650	137,600
38	6.960	19,680	137,000
39	6.920	19,720	136,400
40	6.879	19,750	135,800
41	6.839	19,780	135,200
42	6.799	19,810	134,700
43	6.760	19,830	134,100
44	6.722	19,860	133,500
45	6.684	19,890	132,900

¹ The above figures are taken from Miscellaneous Publication M97 (table 6) of the National Bureau of Standards.

7.6.3 Correction to standard API gravity at 60° F.¹

Observed tempera- ture of oil °F	Observed gravity (degrees API)				
	30	33	36	39	42
50	30.7	33.7	36.7	39.8	42.8
60	30.0	33.0	36.0	39.0	42.0
70	29.3	32.3	35.3	38.2	41.2
80	28.7	31.6	34.6	37.5	40.4
90	28.0	30.9	33.8	36.7	39.6
100	27.4	30.3	33.2	36.1	38.9

¹ The above figures are from "National Standard Petroleum Oil Tables," Circular C410 (March 4, 1936) of the National Bureau of Standards.

7.7 Test procedure. -

7.7.1 The furnace shall be operated under rating-test conditions until steady state conditions of room temperature, fuel flow rate, and flue-gas temperature have been established, followed by a rating test of at least 1 hour's duration. If the floor furnace is equipped with a limit control or other device for reducing the oil input when a pre-determined grille air temperature is attained, such limit control or device shall be rendered inoperative during this test; furthermore, the fuel input shall not exceed the rate determined in accordance with the tests described in paragraphs 7.7.2 and 7.7.3.

7.7.2 The temperature of the limit control sensing element at which the limit control functions shall be determined by means of a thermocouple attached to the sensing element at its midpoint. If necessary, regulate fuel input or restrict warm-air outlet to obtain that value. (If it is found that the fuel rate cannot be increased sufficiently to operate the limit control, then restrict the warm-air outlet.)

7.7.3 Make the limit control inoperative but allow the sensing element to remain in its normal position. Operate the furnace at rated draft and at rated high-fire input. The temperatures of the sensing element and of the outlet air shall not exceed the values indicated below:

$$Tb2 \leq Tbl + (Tr - 60).$$

Tbl = Temperature, °F, of limit control sensing element required for limit control to function.

Tb2 = Temperature, °F, of limit control sensing element obtained during test.

Tr = Room temperature, °F, measured by thermometer placed 6 in. from outside of register adjacent to cold-air return and 1 in. above register level.

60 = Assumed maximum room temperature at floor level under conditions requiring continuous operation at high fire.

7.7.4 Fluctuation of draft. - The maximum fluctuation in draft from the recorded average during the tests shall not exceed ± 0.005 in. of water column.

7.7.5 High-fire draft. - The average draft during the high-fire test shall be that recommended by the manufacturer, but in no case less than 0.02 in. nor more than 0.06 in. of water column.

7.7.6 High-fire fuel-feed rate. - The fuel-feed rate shall be slowly increased to the desired rate for high-fire operation, but in no case shall it exceed the rate at which the furnace will pass the smoke test and the unburned-fuel-gases test, nor shall it exceed the average rate secured during the Underwriters' Safety Test.³ (Also see paragraph 5.3, covering temperature of metal surfaces.)

The fuel-feed rate shall then be maintained constant throughout the test. This condition is regarded as met if four consecutive fuel readings taken at approximately equal intervals throughout the test period do not deviate by more than 2 1/2 percent from the average of the four readings.

7.7.7 High-fire start of smoke test. - For high-fire operation the smoke test shall begin after steady state conditions have been established.

7.7.8 Low-fire draft. - When operated at low-fire setting, (1) the fire shall not snuff out at the draft recommended by the manufacturer for high-fire operation but not to exceed 0.06 in. of water column; and (2) the smoke test shall be run at a draft of 0.02 in. of water column. The draft regulator shall be free to operate in the low-fire test for snuff out.

7.7.9 Low-fire fuel-feed rate. - The fuel-feed rate for low-fire operation shall be that recommended by the manufacturers, but not in excess of 25 percent of the high-fire

³ In the Underwriters' Safety Test the furnace is operated with the valve at its maximum high-fire valve setting. The average fuel-feed rate may be obtained from Underwriters' Laboratories, Inc.

test rate.

7.7.10 Low fire - start of smoke test. - For low-fire operation the smoke test shall begin after equilibrium conditions have been established.

7.7.11 Smoke test. - The amount of smoke in the flue gas at each rate of fire required for tests shall not exceed that indicated by a #6 spot on Shell-Bacharach smoke scale on any of three samples drawn at 20 minute intervals at the point indicated in figures 2 and 3 of this standard.

7.7.12 Unburned fuel gases shall not occur in the flue products in sufficient quantities to be measured by recognized methods of gas analysis as unburned fuel-gas or vapors in excess of 0.1 percent by volume.

7.7.13 Stack temperature during high-fire operation. - The observed flue-gas temperature at maximum-output rating shall not be more than 780° F. above room temperature.

7.8 Observations during test. - After equilibrium conditions have been established, the actual rating test shall be started and continued for at least 1 hour. The following observations shall be made and recorded at the start of the test and at two approximately equal intervals throughout the test:

- (a) Draft in flue pipe.
- (b) Room temperature
- (c) Rate of flow of oil to heater
- (d) Flue-gas temperature (read immediately before taking flue-gas sample.)
- (e) Percentage of CO₂, and CO in flue gas.
- (f) Smoke meter reading.
- (g) The barometric pressure which shall be read at least once during the test.
- (h) The absence of visible red spots on the combustion chamber which will be accepted as evidence of compliance with the temperature requirements of paragraph 5.3.

7.9 Calculation of furnace efficiencies, ratings, etc. - The calculation of results on all combustion data shall be based on figures 8 and 9 (on which allowances have been made for heat losses in the flue gas).

7.10 Corrections for altitude. - The appropriate correction factor from the following table may be used for converting the fuel-oil-input rate at the smoke point at higher altitudes to the corresponding fuel-input rate at sea level. (In no case, however, shall the corrected fuel-input rate used for furnace rating purposes exceed the average rate secured during the Underwriters' Safety Test.)

7.10.1 Altitude-correction factors. -

Approximate altitude ¹ ft.	Barometric pressure in. mercury	Correction factor	Approximate altitude ¹ ft.	Barometric pressure in mercury	Correction factor
0 -----	30.0	1.00	4,000-----	26.0	1.16
500-----	29.5	1.02	4,500-----	25.5	1.18
1,000-----	29.0	1.04	5,000-----	25.0	1.20
1,500-----	28.5	1.06	5,500-----	24.5	1.22
2,000-----	28.0	1.08	6,000-----	24.0	1.24
2,500-----	27.5	1.10	6,500-----	23.5	1.26
3,000-----	27.0	1.12	7,000-----	23.0	1.28
3,500-----	26.5	1.14			

¹ The effective furnace output rating for regions higher than sea level may be estimated by dividing the rated hourly heat output at sea level by the conversion factor corresponding to the higher altitude indicated above. If provisions are made for assuring correct air supply for high altitude work in accordance with the above table, this correction in output is not required. Such units as are intended for high altitude work shall be plainly marked, adjacent to the manufacturer's rating nameplate, with the altitude range for which they are designed.

8. PUBLICATION OF FURNACE RATINGS

8.1 No published, listed, or labeled rating shall be based on efficiencies of less than 70 percent, nor on fuel oil heavier than the heaviest grade for which the furnace is approved by Underwriters' Laboratories. All such ratings shall be determined as outlined in Section 7 and shall be expressed thus:

Output-----Btu per hr at-----draft with CS No-----oil.

The manufacturer's test data and certificate, recorded on a Data and Report Sheet similar to that included herein, and based on rating and performance tests conducted according to this standard either in the manufacturer's laboratory, or other adequately equipped laboratory which he may elect, are acceptable under this standard for publication of furnace ratings.

OIL-BURNING FLOOR FURNACE RATING TEST -- DATA AND REPORT SHEET

Manufacturer's Test No. _____

Floor furnace _____
 Make Model, type, or No. Number and size of burners
 Fuel used for test _____
 CS12-48 Grade API gravity at 60° F
 Date of test _____ Tested by _____

Test data		Three readings at equal intervals			Average
1.	Draft- - - - - (in. water) -	-----	-----	-----	-----
2.	Room temperature - - - - - (°F) -	-----	-----	-----	-----
3.	Smoke-meter readings (spot # -) -	-----	-----	-----	-----
4.	Fuel-temperature readings - - - - - (°F) -	-----	-----	-----	-----
5.	Time intervals used for readings- (min) -	-----	20	20	20
6.	Fuel-input readings- - - - - (lb) -	-----	-----	-----	-----
7.	Fuel-oil input rate - - - - - (lb/hr, avg)	-----	-----	-----	-----
8.	Barometric pressure - - - - - (in. mercury)	-----	-----	-----	-----
9.	Factor to correct fuel-oil input to sea level (see par. 7.10.1)	-----	-----	-----	-----
10.	Gross heating value of oil- - - - - (Btu/lb)	-----	-----	-----	-----
11.	Fuel-oil input corrected to sea level or to average rate secured during Underwriters' Safety Test, whichever is less - (lb/hr, avg)	-----	-----	-----	-----
12.	Gross heat input corrected to sea level or to average rate secured during Underwriters' Safety Test, whichever is less - (Btu/hr)	-----	-----	-----	-----
13.	Flue-gas temperature - - - - - (°F) -	-----	-----	-----	-----
14.	Flue-gas temperature rise above room temperature - - - - - (°F) -	-----	-----	-----	-----
15.	CO ₂ in dry flue gas - - - - - (%) -	-----	-----	-----	-----
16.	CO - - - - - (%) -	-----	-----	-----	-----
17.	Efficiency for complete combustion (from chart, fig. 8 or 9)	-----	-----	-----	-----
					Average
18.	Heat output to room equals item 12 times item 17-(Btu/hr, avg)	-----	-----	-----	-----
19.	Fuel-input rate for low-fire smoke test (par. 7.7.9) - - - (lb)	-----	-----	-----	-----
20.	Low-fire smoke-meter readings at 20-min. intervals (spot # -) -	-----	-----	-----	-----
21.	Low-fire snuff-out test at 0.06 in. draft	-----	-----	-----	-----

We hereby certify that the above is a true and accurate copy of the data obtained when the above furnace was tested in strict accordance with Section 7 (Laboratory Test Code) of Commercial Standard CS113-63 Oil Burning Floor Furnaces Equipped With Vaporizing Pot-Type Burners.

For _____
 (Name of testing agency)

Address _____

By _____

 Date

9. LABELING

9.1 The following data shall be permanently affixed to each furnace as evidence of compliance with the provisions of this standard.⁴

(a) At top of plate the wording "Commercial Standard CS113-63" in a size and style of type corresponding to that on the cover page of the printed standard (10 point Franklin gothic) or larger type size.

(b) The manufacturer's or distributor's name.

(c) Model Number.

(d) Output in Btu per hour at _____ draft with CS #1 oil.

(e) Heaviest grade of oil for which the heater is approved and other labeling requirements of Underwriters' Laboratories, Inc.

10. INSTALLER'S CERTIFICATE

10.1 Installer's certificate. - The following certificate, supplied by the manufacturer, shall be placed with each individual installation by the installer:

This _____ floor furnace has been installed in
(Brand or company name)
strict compliance with the requirements of Commercial Standard CS113-63 as developed by the industry under Commodity Standards Procedures and issued by the U.S. Department of Commerce.

(Date)

(Signature of installer)

11. GENERAL INSTALLATION REQUIREMENTS AND FIELD TEST

11.1 SIZING. -

11.1.1 Heat loss. - The heat loss may be based on a formula established by the American Society of Heating, Refrigerating & Air Conditioning Engineers. Base calculations for residences on 70° F inside all the rooms to be heated when outside temperature is at design temperature. For other types of buildings the inside design temperatures shall be as recommended by the ASHRAE- Guide. Simplified formulas are generally used by oil floor furnace manufacturers, and the use of any one of these formulas is permissible provided the result is not less than that obtained from the ASHRAE current method.

11.1.2 Size. - After determining the correct heat loss, a pick-up factor of not less than 10 percent shall be added. The minimum size furnace or furnaces can then be selected. When selecting the proper size of furnace, the output rating of a furnace or the combined output ratings of the furnaces shall be not less than the computed maximum hourly heat loss, including the pick-up factor.

11.2 PLACEMENT. -

11.2.1 General. - After selecting the proper size of furnace or furnaces, the next important consideration is the placement of the furnace or furnaces. The following are requirements that will serve in properly placing the furnace or furnaces to serve one-story buildings.

11.2.2 Distance. - To meet varying conditions of climate and usage, it is recommended

⁴ The information required for commercial standard labeling may be combined with Underwriters' label or may be carried on a separate adjacent label.

that the furnace be so located that for residences the maximum distance, center to center, between the furnace and any room to be heated by it, measured through intervening openings, should be as short as possible, preferably not to exceed 15 ft.

11.2.3 Doorways. - The furnace or furnaces shall be so placed that any single path of air circulating to and from the furnace does not pass through more than one doorway and one arch.

11.2.4 Walls and corners. - With the exception of wall-register models, a floor furnace shall not be placed closer than 6 in. to the nearest wall, and wall-register models shall not be placed closer than 6 in. from a corner.

11.2.5 Drapes. - The furnace or furnaces shall be so placed that a door drape or similar object cannot be nearer than 12 in. to any portion of the register of the furnace.

11.2.6 Bathroom. - Any dual-wall register furnace installed between bathroom and adjoining room shall not recirculate air from the bathroom.

11.2.7 Exposure. - In case there is a choice of locations, the furnace shall be nearer the sides of the house exposed to the prevailing winter winds.

11.2.8 Central location. - Generally speaking, the more central the location the better, favoring slightly the sides exposed to the prevailing winter winds.

11.2.9 Floor levels. - The floor immediately surrounding the floor furnace shall be reasonably level. When heating two rooms having different floor levels, the furnace shall be installed in the room having the lower floor. It is also well to locate the furnace near the steps, if possible. Where a dual-wall register furnace is installed between rooms having different floor levels, the furnace shall be installed at the lower floor level with an approved vertical extension to the upper floor level.

11.2.10 Bracing. - The floor around the furnace shall be braced and headed with framework of material not lighter than the joists. The inside dimensions of the framework shall be approximately 1/2 in. longer and wider than the furnace to be installed.

11.2.11 Combustion air. - Fixed ventilation shall be provided to any confined space that encloses the floor furnace, if combustion air is taken from this space, by means of a duct or grille arranged to supply air from a permanently ventilated attic or under-floor space; the duct or grille shall be screened and shall have a free area at least twice the free area of the vent collar of the floor furnace, and be installed in such a manner as to insure proper combustion.

11.2.12 Seepage pan. - Whenever the excavation for clearance from the ground exceeds 12 in., or water seepage is apparent under the house, a watertight copper pan, concrete pit, or watertight barrier of other suitable material shall be used. A copper pan shall be made of not less than 16-oz. per sq. ft. sheet copper. The pan shall be anchored in place, and the walls shall extend at least 4 in. above the ground level, with a 12-in. clearance from furnace casing on all sides, except the control side, which shall have an 18-in. clearance.

11.2.13 Access. - Adequate provision shall be made for easy access to the furnace under the house by means of an opening in the foundation wall, or through a trap door of at least 18 by 24 in., located at some convenient point in the house, and by a clear and unobstructed passageway to the furnace at least 18 in. high by 24 in. wide.

11.2.14 Appliance alterations. - All floor furnaces, including those having single or dual-wall register outlets, shall be installed as approved under this standard without alterations, extensions, or changes of any kind in the furnace.

11.3 CHIMNEYS, FLUES AND BREECHINGS

11.3.1 General. - The combustion gases from each floor furnace shall be properly discharged to the outer air. Paragraphs 11.3.2 to 11.3.7 specify requirements covering the proper discharge of combustion gases from a floor furnace to the outer air. In the discharge of combustion gases sufficient draft shall be created to develop the maximum output rating of the floor furnace.

11.3.2 Draft regulator. - A draft regulator which meets the approval requirements of Underwriters' Laboratories, Inc., shall be made a part of the breeching connecting the floor furnace and the vertical chimney or flue.

11.3.3 Damper. - A damper or similar device shall never be installed in the breeching.

11.3.4 Chimney or flue construction. - In case a prefabricated chimney or flue (not a conventional masonry chimney) is used, it shall be listed by the Underwriters' Laboratories, Inc., for use with oil as the fuel, and the installation shall comply with the conditions of the listing. When a conventional masonry chimney is used it shall be lined with a terra cotta or comparable flue lining. In addition, the construction of the chimneys or flues shall comply with applicable building codes. If the floor furnace is not equipped with a mechanical-draft burner, it is recommended that it be connected to an individual flue in the vertical chimney or flue.

11.3.5 Breeching. - The breeching connecting the floor furnace and the vertical chimney or flue shall be made as short as practicable. The length of the breeching shall not exceed 50 percent of the vertical height of the portion of the chimney or flue above the breeching inlet when the floor furnace contains a natural-draft burner, or 75 percent when the floor furnace contains a mechanical-draft burner, and shall be limited in either case to a maximum length of 10 ft. The breeching shall have an upward slope from the floor furnace of not less than 1/4 in. per foot of length and shall not project into the free area of the vertical chimney or flue.

11.3.6 Cross-over or offset. - It is recommended that cross-overs or offsets not be used in the vertical chimney or flue. In no case shall the angle of a cross-over or offset be less than 60° to the horizontal.

11.3.7 Holes. - Both the breeching and the vertical chimney or flue shall be clear and free from any stoppage, and, other than for the draft regulator opening, shall be free from any holes that would restrict draft.

11.4 FIELD TESTS. - For the purpose of making field tests, the following minimum equipment and procedure are recommended.

11.4.1 Instruments required. - (1) A mercury-type flue-gas thermometer, long enough to reach the center of the smoke pipe, and accurate within plus or minus 5° F. (2) Apparatus suitable for measuring the CO₂ content of the flue gas with an accuracy of plus or minus 0.5 percent. (3) A draft gage of suitable capacity, with an accuracy of plus or minus 0.005-inch of water column. (4) Means for accurately measuring the flow rate of oil to the furnace, either during the test or as adjusted for the test.

11.4.2 Test setup. - (1) Provide one or more openings in the smoke pipe 18 inches from the flue outlet (See fig. 2.) for the flue-gas thermometer, the gas-sampling tube, and the draft tube. Do not insulate the smoke pipe. (2) Provide for chimney draft slightly in excess of that shown on the name plate to insure proper operation of the draft regulator and furnace.

11.4.3 Test procedure. - Light and warm up the furnace, using the grade of oil recommended by the manufacturer. Adjust the draft to the value shown on the name plate. Adjust the fuel-input rate to the maximum recommended by the manufacturer, and operate the furnace, at this rate for at least 15 minutes. Take draft and flue-gas temperature readings, then take and analyze the flue-gas sample for CO₂. Take several sets of readings and average the results. Compare the observed flue-gas temperature and CO₂ readings with those shown in the following table.

11.4.4 Table for checking results of oil floor furnace performance tests.

Observed flue-gas temperature	Acceptable corresponding CO ₂ values from flue-gas analysis
Above 1,000° F -----	Furnace fails test.
1,000 F -----	9½% or more.
900° to 999° F -----	8½% or more.
800° to 899° F -----	7½% or more.
700° to 799° F -----	6% or more.
600° to 699° F -----	5% or more

Example: If a field test shows a flue-gas temperature of 950° F. and a CO₂ reading of 8½ percent, or more, the furnace is performing satisfactorily.

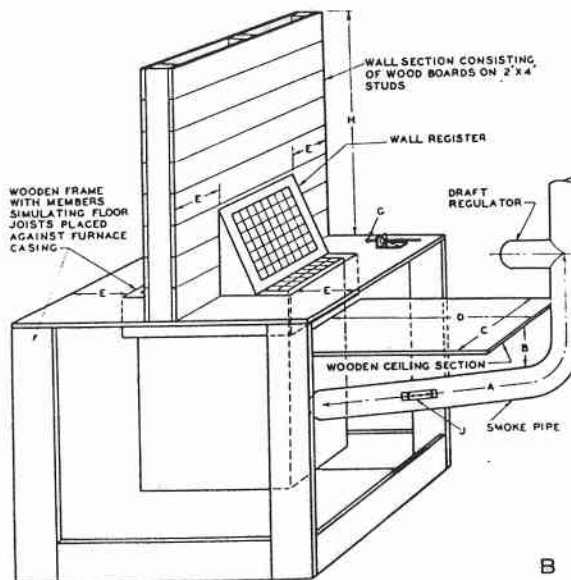
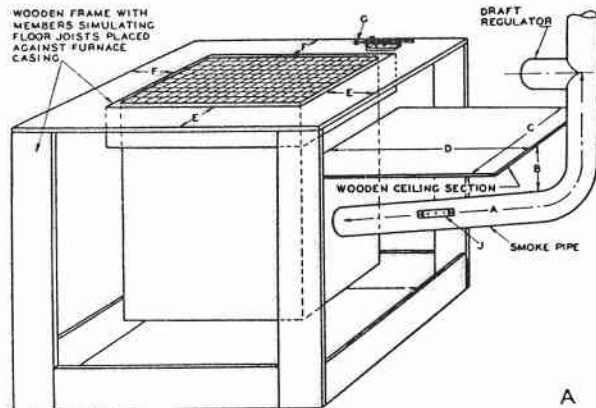


FIGURE 1. Test set-ups for floor furnaces.

A. Test set-up for floor-register type floor furnaces: A, Minimum of 6 ft of smoke pipe between furnace and draft regulator; B, 9 in.; C, smoke pipe diameter, plus 2 ft (minimum); D, $3\frac{1}{2}$ ft minimum; E, 1 ft minimum; F, minimum spacing recommended by manufacturer; G, thermometer, placed 6 in. from outside of register adjacent to cold-air return and 1 in. above register level; J, support bracket (see fig. 3).

B. Test set-up for wall-register type floor furnaces: A, Minimum of 6 ft of smoke pipe between furnace and draft regulator; B, 9 in.; C, smoke-pipe diameter, plus 2 ft (minimum); D, $3\frac{1}{2}$ ft minimum; E, 1 ft minimum; G, thermometer, placed 6 in. from outside of register adjacent to cold-air return and 1 in. above register level; H, 4 ft minimum; J, support bracket (see fig. 3).

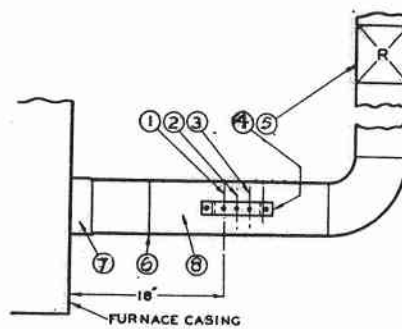


FIGURE 2. Furnace flue connections.

1. Center line of thermocouple.
2. Gas-sampling tube.
3. Draft tube.
4. Support bracket.
5. Draft regulator.
6. Seal all openings in smoke pipe below gas-sampling tube.
7. Heater flue collar.
8. Section of smoke pipe, same nominal diameter as furnace flue collar.

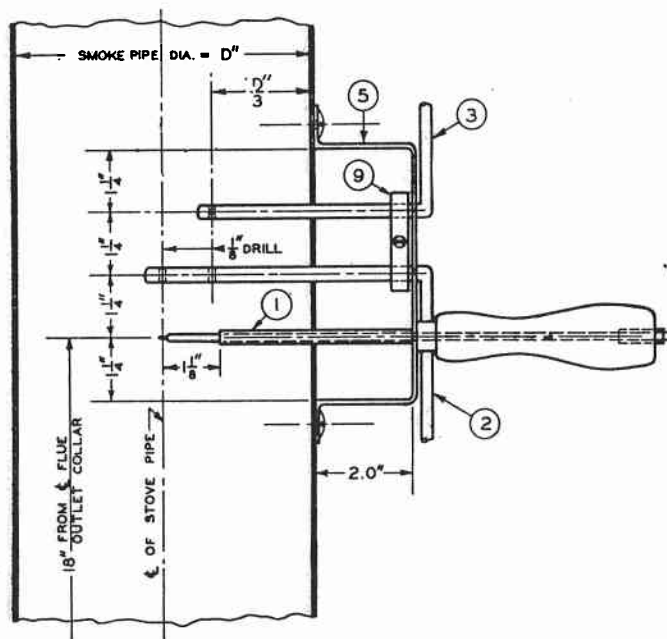


FIGURE 3. Gas-sampling and draft tubes, thermocouple, and support bracket assembly.

- 1, Thermocouple (see fig. 4); 2, 3, gas-sampling and draft tubes (3/4 in. by approx. 0.032-in. wall, yellow brass or steel); 4, 5, support bracket and tube clamp (3/4-in. by 0.003-in. half-hard flat steel wire)

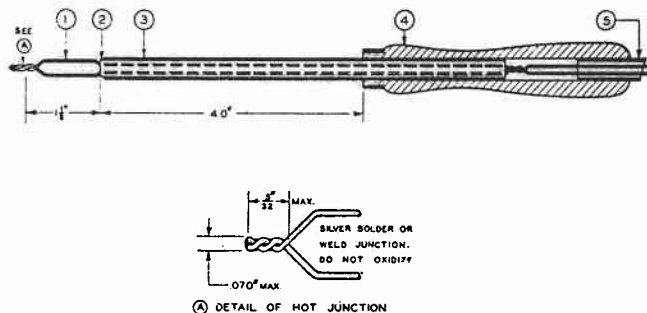


FIGURE 4. Standard thermocouple for flue-gas temperature measurement.

1, Ten-foot No. 20 B & S gage iron-constantan asbestos or woven glass covered thermocouple wires extending from hot junction to potentiometer or reference junction; 2, Leeds & Northrup standard 714B, or equal, 1/4-in. O. D. 2-hole porcelain insulator, cut 6.0 in. long and ends beveled on two sides; 3, 1/4-in. O. D. by 0.032-in. wall half-hard yellow-brass tubing cut 5 1/4 in. long. Ream, if necessary, to fit over insulator, then crimp ends over beveled ends of insulator; 4, small wooden handle; 5, piece of rubber tubing, 5/16 by 1/2 by 2 in. long. Detail of hot junction: Silver solder or weld junction. Do not oxidize.

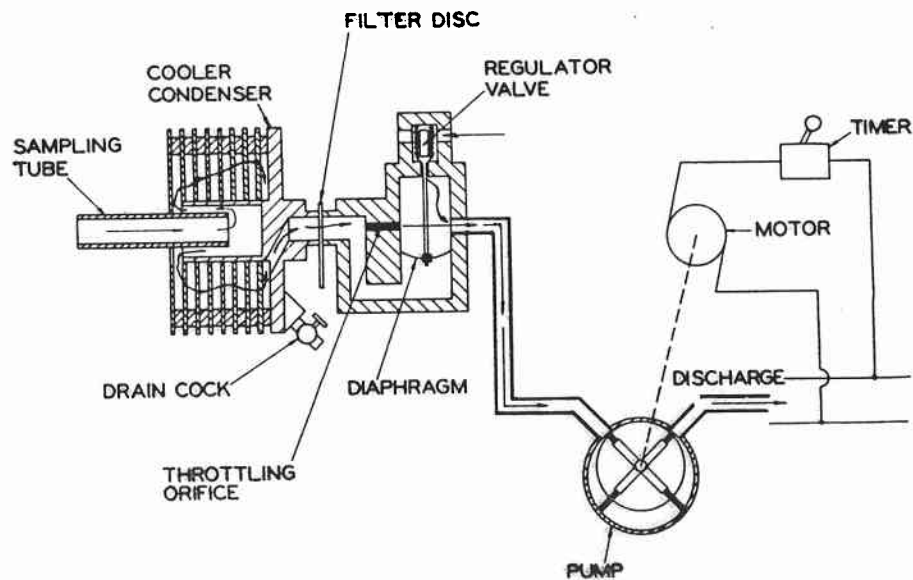


FIGURE 5. LABORATORY-TYPE SMOKE METER

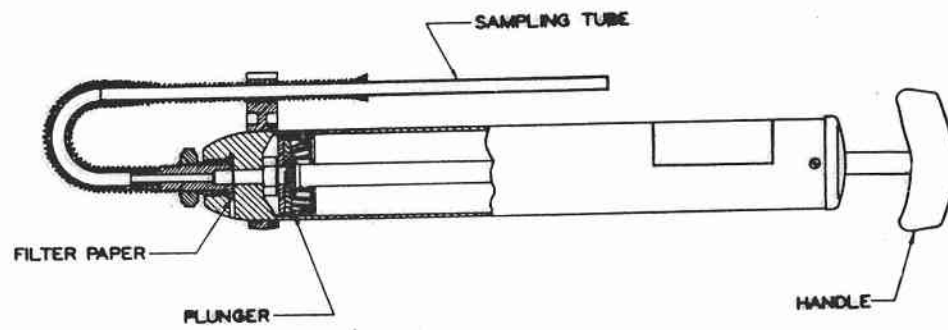


FIGURE 6. FIELD-SERVICE-TYPE SMOKE TESTER

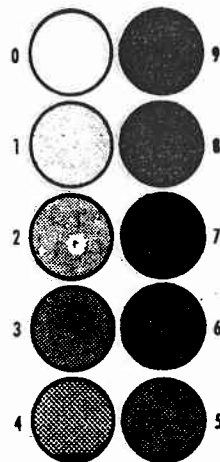


FIGURE 7 . SMOKE SCALE FOR FILTER-PAPER METHOD FOR DETERMINING SMOKE DENSITY
IN FLUE GASES
(CAUTION: ABOVE ILLUSTRATION IS NOT A USABLE SMOKE SCALE.)

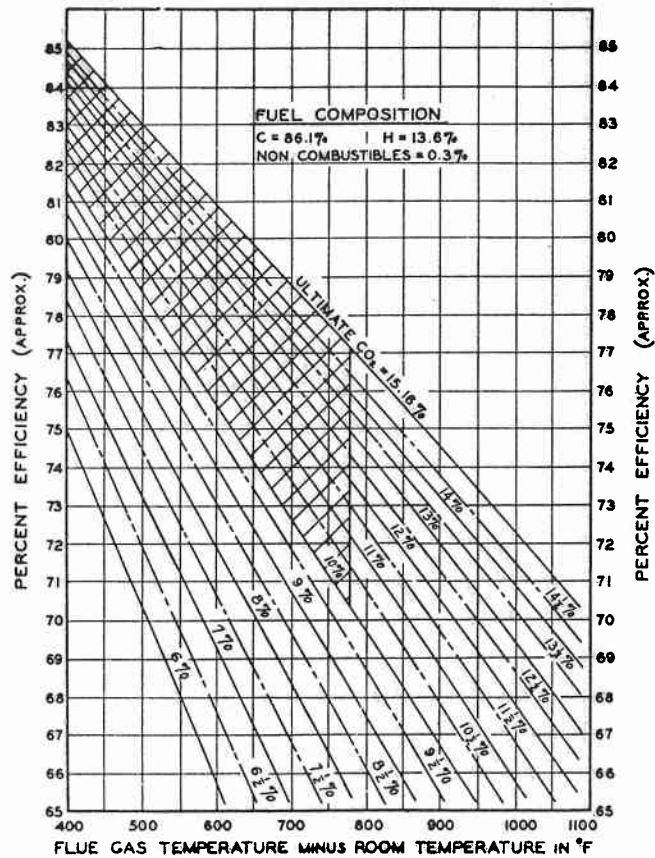


FIGURE 8. Enlarged efficiency chart for furnaces equipped with vaporizing pot-type burners.

NOTE.—Cross-hatched portion shows area of acceptable performance for high-fire operation (par. 7.7.13)

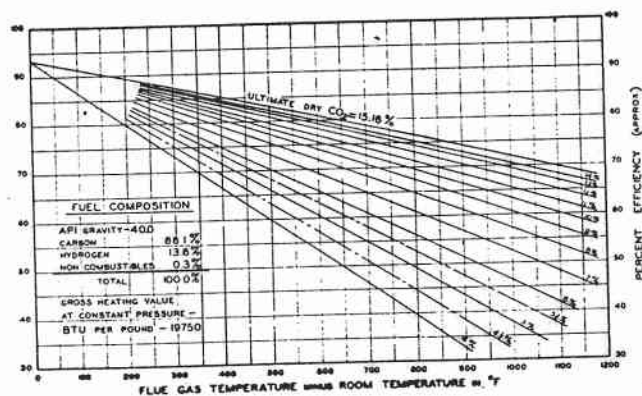


FIGURE 9. Efficiency chart for furnaces equipped with vaporizing pot-type burners.

HISTORY OF PROJECT

Pursuant to suggestions from the Consumer Division, Office of Price Administration in February 1942 the interested manufacturers, in cooperation with the National Bureau of Standards developed a proposed Commercial Standard for oil-burning floor furnaces. The proposal was considered at a manufacturers' conference in Chicago, and was adopted in revised form as an industry recommendation after consideration of comments from leading distributors, testing laboratories, Government agencies and other users. Further consideration was given in a wide circulation to the trade on July 6, 1943, after which it was generally accepted by the interested industry organizations. An announcement was issued on October 20, 1943, that the standard would be designated CS113-44 and become effective February 17, 1944.

First revision. - On July 3, 1946, at the suggestion of a manufacturer, a proposed revision was initiated. A draft was prepared and referred to the Standing Committee, whose favorable recommendations were subsequently given. The revision was submitted to the industry for consideration on June 1, 1950, and following general acceptance, the revised standard was announced as CS113-51, effective February 1, 1951.

Second revision. - The Oil Division of the Institute of Appliance Manufacturers in June 1958 recommended certain revisions and subsequently cooperated in preparing a draft which was suitably coordinated with other Commercial Standards. After further development in cooperation with the IAM, in 1959, 1960 and 1961, the revision was circulated on December 3, 1962 to producers, distributors, and users as an industry recommendation. It was subsequently given general endorsement by acceptors in representative industry organizations, and on July 1, 1963 the revised standard, CS113-63, was announced as being effective August 1, 1963.

Project Manager: H. A. Bonnet, Office of Commodity Standards, National Bureau of Standards, U.S. Department of Commerce.

Technical Advisors: E. W. Bender, Fire Research Section, National Bureau of Standards, U.S. Department of Commerce.
Marc Resek, Institute of Appliance Manufacturers' Engineering Consultant.

STANDING COMMITTEE

The Standing Committee was being formed when this standard was published. The chief functions of the committee are to consider proposed revisions, and make recommendations for keeping the standard abreast of progress. Such changes are circulated for industry review and acceptance prior to adoption and issue.

Comments on the standard and suggestions for revision may be referred to a member of the committee or to the Office of Commodity Standards, National Bureau of Standards, U.S. Department of Commerce, which acts as secretary for the committee. Further information on the committee may be obtained from the Office of Commodity Standards.

ACCEPTORS

The manufacturers, distributors, users, and others listed below have individually indicated in writing their acceptance of this Commercial Standard prior to its publication. The acceptances indicate an intention to utilize the Standard as far as practicable, but reserve the right to depart from it as may be deemed desirable. The list is published to show the extent of recorded public support for the Standard, and should not be construed as indicating that all products made by the acceptors actually comply with its requirements.

Products that meet all requirements of the standard may be identified as such by a certificate, grade mark or label. Purchasers are encouraged to require such specific representation of compliance, which may be given by the manufacturer whether or not he is listed as an acceptor.

ASSOCIATIONS (General Support)

American Institute of Architects,
Washington, D.C.
American Specification Institute, Chicago,
Ill.
Institute of Appliance Manufacturers,
Washington, D.C.

Underwriters' Laboratories, Inc., Chicago,
Ill.

Warren, Little & Lund, Inc., Spokane, Wash.

U.S. GOVERNMENT

FIRMS AND OTHER INTERESTS

Atchison, Topeka & Santa Fe Railway Co.,
The, Topeka, Kans.

Central Supply Association, Chicago, Ill.
(General Support).
Coleman Co., Inc., The, Wichita, Kans.

Detroit Testing Laboratory, Inc., Detroit,
Mich.

Hirzel, Charles K., Architect, New York,
N.Y. (General Support).

Kresky Manufacturing Co., Inc., Petaluma,
Calif.

Marc Resek Research & Development, Inc.,
Shaker Heights, Ohio (General Support).

New York State Building Codes Bureau,
Division of Housing & Community Renewal,
New York, N.Y.

Reid, William H., Architect-Engineer,
Whittier, Calif.

Sears, Roebuck and Co., Chicago, Ill.

Thermo-Products, Inc., North Judson, Ind.

Twining Laboratories, Inc., The, Fresno,
Calif.

Department of Agriculture, Livestock Engi-
neering & Farm Structures Research
Branch, Washington, D.C.

Department of the Army, Office of Chief of
Engineers, Engineering Division, Mili-
tary Construction, Washington, D.C.

Department of Health, Education & Welfare,
Procurement & Supply Management Branch,
Washington, D.C.

Department of the Interior, Division of
Property Management, Washington, D.C.

Department of Justice, Bureau of Prisons,
Utilities Section, Washington, D.C.

Department of the Navy, Bureau of Yards &
Docks, Mechanical Specification Section,
Washington, D.C.

ACCEPTANCE OF COMMERCIAL STANDARD

CS113-63 OIL-BURNING FLOOR FURNACES EQUIPPED WITH VAPORIZING POT-TYPE BURNERS

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this Commercial Standard.

Date _____

Office of Commodity Standards
National Bureau of Standards
U.S. Department of Commerce
Washington, D.C. 20234

Gentlemen:

We believe that this Commercial Standard constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production¹ distribution¹ purchase¹ testing¹
of this commodity.

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer _____
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____
(Fill in exactly as it should be listed)

Street address _____

City, State, and ZIP code _____

¹ Underscore the applicable words. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interest, trade associations, trade papers, etc., desiring to record their general support, the words "General Support" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. Enforcement. - Commercial Standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. The acceptor's responsibility. - The purpose of Commercial Standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the standard, where practicable, in the production, distribution, or consumption of the article in question.

3. The Department's responsibility. - The major function, performed by the Department of Commerce in the voluntary establishment of Commercial Standards on a nationwide basis is fourfold: First, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. Announcement and promulgation. - When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

DEPARTMENT OF COMMERCE
National Bureau of Standards
VOLUNTARY PRODUCT STANDARDS
Notice of Action on Proposed
Withdrawal

In accordance with the provisions of § 10.12 of the Department's published "Procedures for the Development of Voluntary Product Standards" (15 CFR Part 10, as amended; 35 F.R. 8349 dated May 28, 1970), notice is hereby given of the withdrawal of the 36 commercial standards (CS) and 25 simplified practice recommendations (SPR) identified below. Each of these standards has been found to be obsolete, no longer technically adequate, no longer generally acceptable to and used by the industry, inconsistent with established policy, or otherwise inappropriate, and revision is not feasible or would serve no useful purpose.

- CS 14-51 Boys' sport and dress shirt (woven fabrics) size measurements.
- CS 33-43 Knit underwear (exclusive of rayon).
- CS 56-60 Strip oak flooring.
- CS 70-41 Phenolic disinfectant (emulsifying type).
- CS 71-41 Phenolic disinfectant (soluble type).
- CS 90-58 Power cranes and shovels.
- CS 101-63 Flue-connected oil-burning space heaters and recessed heaters with vaporizing pot-type burners.
- CS 104-63 Warm-air furnaces equipped with vaporizing-type oil burners.
- CS 106-57 Boys' pajama sizes (woven fabrics).
- CS 109-44 Solid-fuel-burning forced-air furnaces.
- CS 111-43 Earthenware (vitreous-glazed) plumbing fixtures.
- ✓ CS 113-63 Oil-burning floor furnaces equipped with vaporizing pot-type burners.
- CS 128-52 Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes).
- CS 129-47 Materials for safety wearing apparel.
- CS 131-46 Industrial mineral wool products, all types—testing and reporting.
- CS 134-46 Cast aluminum cooking utensils (metal composition).
- CS 135-46 Men's shirt sizes (exclusive of work shirts).
- CS 145-47 Testing and rating hand-fired hot water supply boilers.
- CS 152-48 Copper naphthenate wood preservative (spray, brush, dip applications).
- CS 158-49 Model forms for girls' apparel.
- CS-165-50 Zinc naphthenate wood preservative (spray, brush, dip applications).
- CS 174-41 140-F drycleaning solvent.
- CS 177-62 Bituminous-coated metal septic tanks (residential).
- CS 178-51 Testing and rating ventilating fans (axial and propeller types).
- CS 180-52 Model forms for boys' apparel.
- CS 183-51 Boys' trouser size measurements.
- CS 185-52 Wool felt.
- CS 186-52 Boys' sport outerwear size measurements.
- CS 195-60 Warm-air furnace burner units equipped with pressure-atomizing or rotary type oil burners.
- CS 196-55 Model forms for toddlers' and children's apparel.

- CS 198-55 Infants', children's, girls' and boys' knit underwear (exclusive of rayon, acetate, and nylon).
- CS 216-58 Asphalt insulating siding.
- CS 235-61 Pressure treated wood fence posts (with oil-type preservatives).
- CS 249-62 Pressure-treated Douglas fir marine piles.
- CS 250-62 Pressure-treated southern pine marine piles.
- CS 271-65 Grading of abrasive grain for grinding wheels.
- SPR 17-47 Heavy forged hand tools.
- SPR 44-49 Boxboard thicknesses.
- SPR 60-55 Machine, carriage and lag bolts, and nuts (case quantity and gross weight).
- SPR 72-27 Solid section steel windows.
- SPR 77-45 Hickory handles.
- SPR 100-47 Welded chain.
- SPR 125-31 Waxed tissue paper.
- SPR 136-32 Flax and hemp twine.
- SPR 147-42 Wire diameters for mineral aggregate production screens.
- SPR 157-50 Steel firebox boilers and steel heating boilers (commercial and residential).
- SPR 168-37 Braided shoe laces.
- SPR 180-41 Copper conductors for building purposes.
- SPR 183-46 Brass or bronze valves (gate, globe, angle, and check).
- SPR 184-47 Iron valves (gate, globe, angle, and check).
- SPR 185-47 Pipe fittings (gray cast-iron, malleable iron, and brass or bronze).
- SPR 190-42 Stove pipe and accessories.
- SPR 198-50 Wire rope.
- SPR 207-60 Pipes, ducts and fittings for warm air heating and air-conditioning systems.
- SPR 214-55 Metal-cutting band saws (hard edge flexible back).
- SPR 220-46 Open-end and box wrenches.
- SPR 227-47 Plumbing fixture fittings and trim for housing.
- SPR 229-63 Vises (machinists' and other bench-mounted vises).
- SPR 238-50 Convectors.
- SPR 245-51 Weldless chain and chain products.
- SPR 259-56 Hexagon-head cap screws (case quantity and gross weight).

Public notice of the intention to withdraw these standards was published in the **FEDERAL REGISTER** on June 21, 1972 (37 F.R. 12248), and a 45-day period was provided for the submission of comments or objections concerning the proposed withdrawal of any of these standards. No valid objections to the withdrawal of any of these standards have been received by the National Bureau of Standards.

The effective date for the withdrawal of these standards will be 60 days after the publication of this notice. This withdrawal action terminates the authority to refer to these standards as voluntary product standards developed under the Department of Commerce Procedures.

LAWRENCE M. KUSHNER,
Acting Director.

AUGUST 18, 1972.

[FR Doc.72-14465 Filed 8-23-72; 8:57 am]

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